

Serial No. 09/600,593

REMARKS

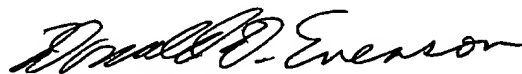
Entry of these supplemental amendments to the amendments of May 30, 2001 and May 29, 2001 is requested.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #1959/49027).

Respectfully submitted,

October 23, 2001



Donald D. Evenson
Registration No. 26,160

DDE:mkh
CROWELL & MORING, LLP
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 628-8800
Facsimile No.: (202) 628-8844

Serial No. 09/600,593

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Page 2, amend the third full paragraph as follows:

The problem is solved according to the invention by providing a universal joint of the above-noted type with one of the following characterizing features; (i) the balls resiliently mounted in the socket; and (ii) an abutment arrangement for the ball and socket is arranged on the inner wall of the housing. [The dependent claims define] Additional advantageous embodiments are described herein.

Page 4, amend second full paragraph as follows:

In universal joint systems especially of the kind mentioned above it is furthermore important that, when the joint is assembled, a guide means is present which brings the ball joint together in a selective manner, and furthermore that in extreme-end positions of the joint, which do not correspond to normal operations, a defined abutment is provided for safety reasons. By designing the junction housing accordingly in the internal area with corresponding [rotting] surrounding abutment surfaces this can be established. Care must be taken that especially the tumbler socket which in some cases bears the bushing will first engage the abutment in the extreme position and only then contact the ball of the joint at a second abutment surface. This assures, especially in the uninstalled condition, that contact in the extreme position is cushioned. This kind of abutment definition is especially suitable for the present resilient ball joint bearing according to the invention, but it can also

Serial No. 09/600,593

be used to advantage in other universal joints without resilient ball joint bearing.

Page 5, amend first full paragraph as follows:

Other embodiments of cross joints are also suitable for universal joint systems. If, for example, especially great ease of movement and uniform motion are required, the double joint is advantageously made with a universal joint, also called a constant velocity joint, especially of the [Gleichlauf-Festgelenk] constant speed fixed link type. Between the two joints, which are joined together by a housing, the ball joint is again arranged with the resilient mounting, so that the shaft extremities are mounted for flexural movement through the two joints. Constant velocity joints are manufactured as "Löbro-Gelenke" by Löhr & Bromkamp GmbH, DE 6050 Offenbach.

Page 6, between the second and third full paragraphs insert: Fig. 3a shows schematically a waiver of the bearing system.

Page 7, between the second and third full paragraphs insert:

Fig. 8b shows a detailed Fig. 8 in section and enlarged.

Page 8, amend first full paragraph as follows:

A steering shaft double-cross universal joint according to the invention is represented in Figures 1 and 2. The joint consists of a [coupling case 8 and a] tubular dual fork

Serial No. 09/600,593

coupling case 8 [, respectively,] in which two joint crosses 9 are respectively mounted for movement. The shaft ends [2 and 3] 1 and 2 are jointed on one another by means of the forks 4 and 6 which are journaled on the joint crosses 9, and to the socket 7 by the ball neck 10 and the balls 5. Bellows can protect the joint against dirt.

Page 8, amend third full paragraph as follows:

In Figure 2 there is shown in cross section a joint rotated 90 degrees, in which the forks 4 and 6 are represented at the shaft ends 1 and 2. The latter can be movably inserted, as mentioned, in the crosses 9 on the casing 8, which can be tubular, for example. In the central inner area of the [housing] casing the end abutments 13 and 14 are represented, which are in the form of annular raised portions and are helpful until the joint is assembled, and serve simultaneously as safety abutments in extreme terminal positions of the joint. The abutment surfaces 13 and 14 are configured such that the socket 7 when in the extreme position with respect to the ball 5 will first make movement-limiting contact with the abutment 13.

Page 9, amend third full paragraph as follows:

In Figure 3 is shown how the socket 7 can be held on the fork with bias as a tumbler socket 7 by springs 31. On account of the great bias force that is to be applied and the small amount of space available, plate springs are preferred. They furthermore are less expensive. Another appropriate spring mounting is possible by the use of rubber-elastic 31P

Serial No. 09/600,593

(Figure 3a) pads which can be in annular form, for example, held between metal disks 31D. This can be done if necessary in a layered configuration.

Page 11, amend first full paragraph as follows:

Additional possibilities for the bearing are represented in Figure 4. In the upper half of the figure a rim 32.2 clutches the fork 6 on the side facing away from the ball of a projection 42. The springs 31 are held between the front side of the projection 42 and a rim of the bushing [22] 11 forming an annular chamber 34.

Page 12, amend second full paragraph as follows:

The guide 32 is preferably injection molded directly into the ball 5. The variant in Figures 9b and 9a shows in longitudinal and cross section an additional preferred possibility for a damping compensation of free play in the unbiased state. The plastic sliding guide 37 is provided in its outer wall area with a plastic spring 39, which permits sliding without free play under bias V. The spring 39 is preferably made in one piece with the plastic guide 37, the spring being preferably slotted 40 so that it can breathe radially and being in contact with the inside surface of the tumbler guide 30 in a wear and tolerance equalizing manner. In Figure 10 the same plastic sliding guide as in Figure 9 is shown in the installed state. The tolerance gaps A, B, which the spring spans with respect to the tumbler guide 30, are shown schematically.

Serial No. 09/600,593

IN THE CLAIMS:

Please amend the claims as follows:

23. (Amended) Joint according to claim 21,
wherein the resilient mounting includes [is] metal
springs, preferably plate springs.

32. (Amended) Joint according to claim [21] 20,
wherein a plastic sliding guide is provided between the
socket and the ball such that it receives the ball for
rotational movement and is carried for sliding movement in the
axial direction by the socket, the guide being preferably
injection-molded directly onto the ball.